Microscopic Examination procedure

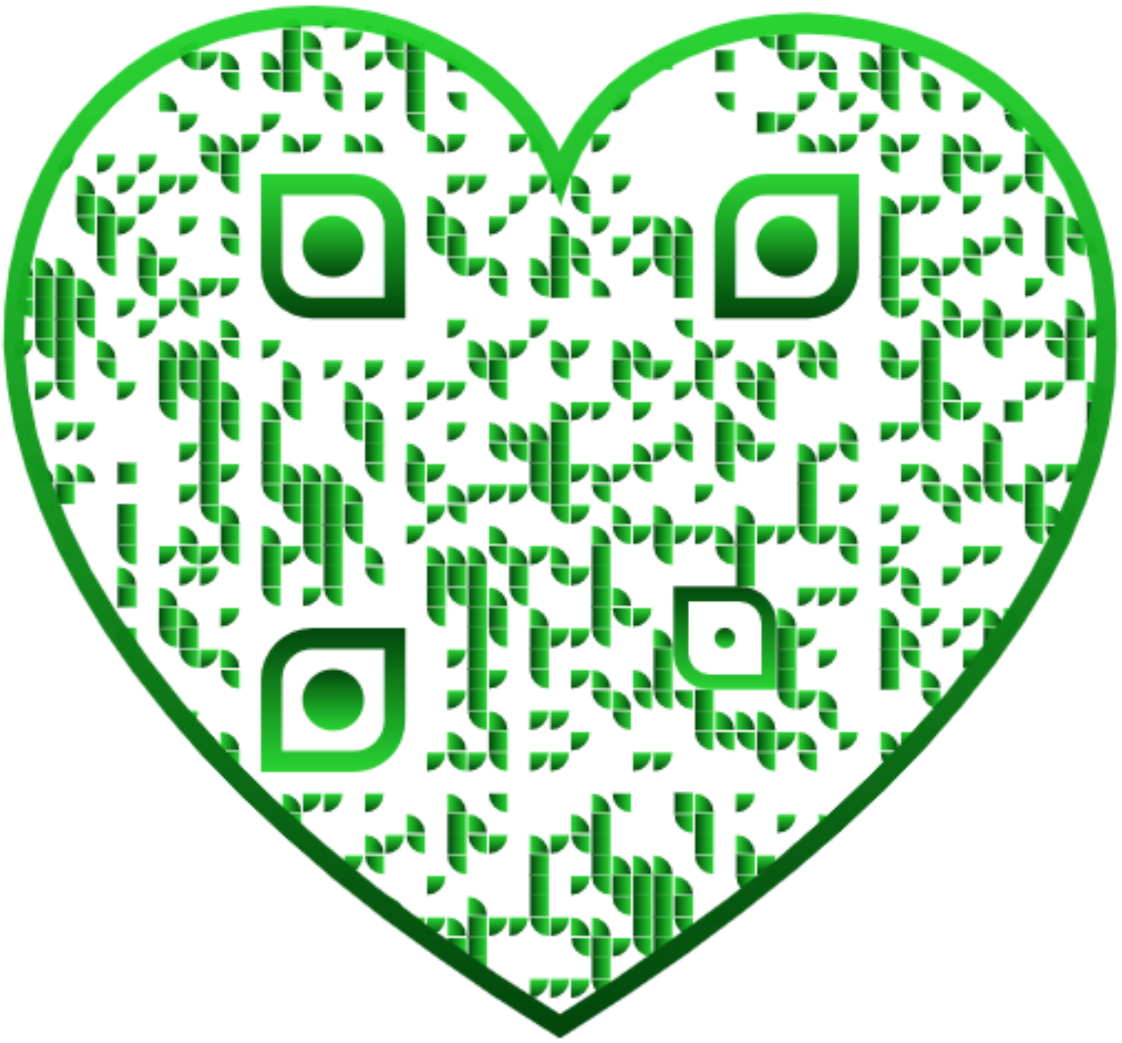
- **Centrifugation:**

1- put 9-11 ml of urine sample in to test tube.

2-The urine centrifugation is 5 minute at 1200 rpm

3- Discard supernatant and place one drop of sediment in glass slide.

4-place the glass slide on the microscope.



Classification of urine sediment

Organized elements:

1-Epithelial cells

2-Leukocytes.

3-Erythrocytes.

4-casts.

5-Bacteria,Yeast,Parasite ,sperm

- **Unorganized elements**:

1-Crystals.

2-Mucus threads.

Microscopic Examination

Abnormal Findings

Per High Power Field (HPF) (40 x)

- > 3 erythrocytes
- > 5 leukocytes
- > 2 renal tubular cells
- > 10 bacteria

Per Low Power Field (LPF) (10x)

- > 3 hyaline casts or > 1 granular cast
- > 10 squamous cells (indicative of contaminated specimen)
- Any other cast (RBCs, WBCs)

Presence of:

- Fungal hyphae or yeast, parasite, viral inclusions
- Pathological crystals (cystine, leucine, tyrosine)
- Large number of uric acid or calcium oxalate crystals

Microscopic Examination

Organized elements:

1-Erythrocytes > 3 erythrocytes

2-Leukocytes > 5 leukocytes

3-Epithelial Cells

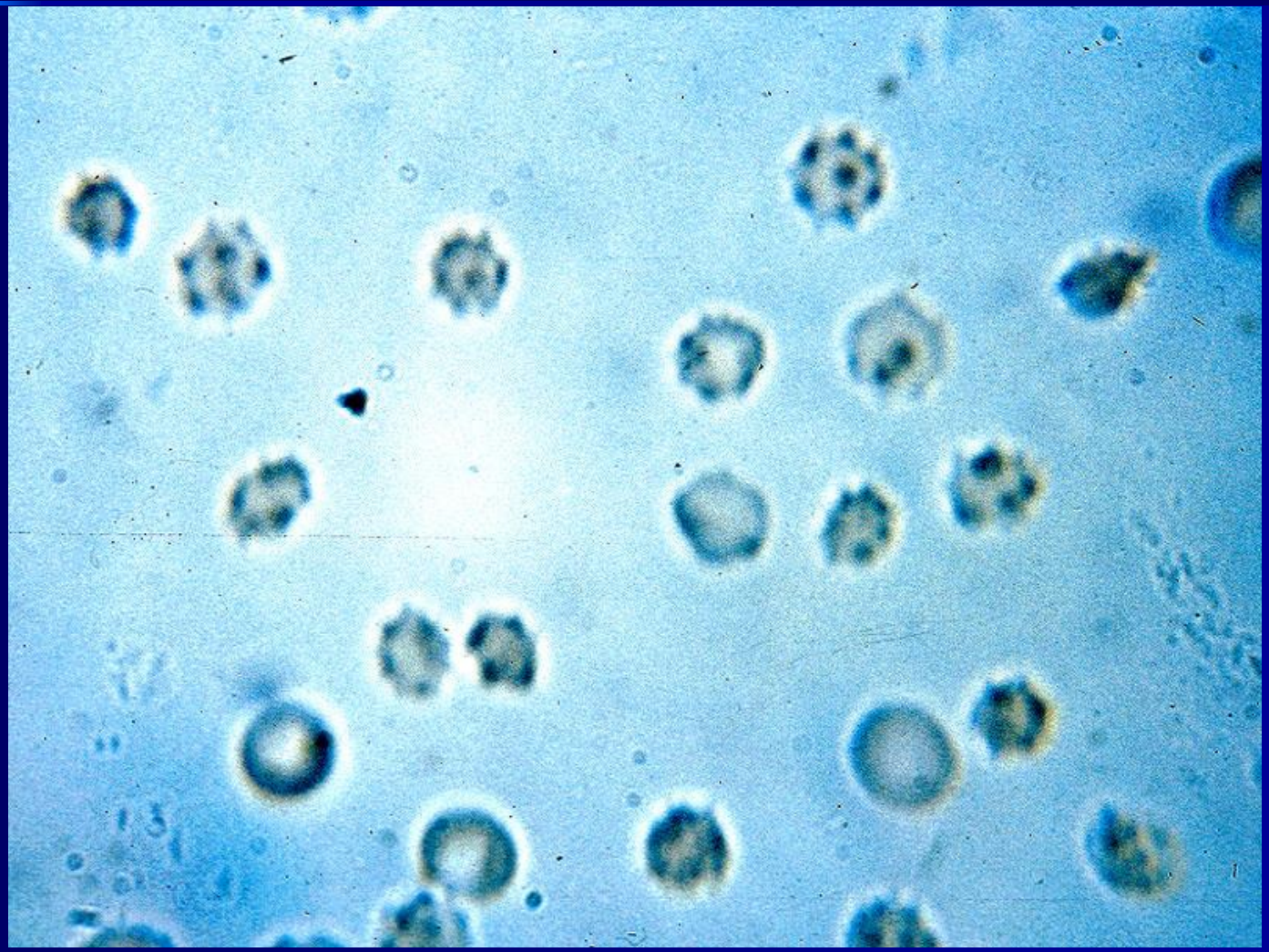
- Squamous cells > 10	Indicate level of contamination
- Renal tubular epithelial cells > 2	Few are normal
- Transitional epithelial cells > 2	Few are normal
- Oval fat bodies	Abnormal, indicate Nephrosis

Microscopic Examination

RBCs

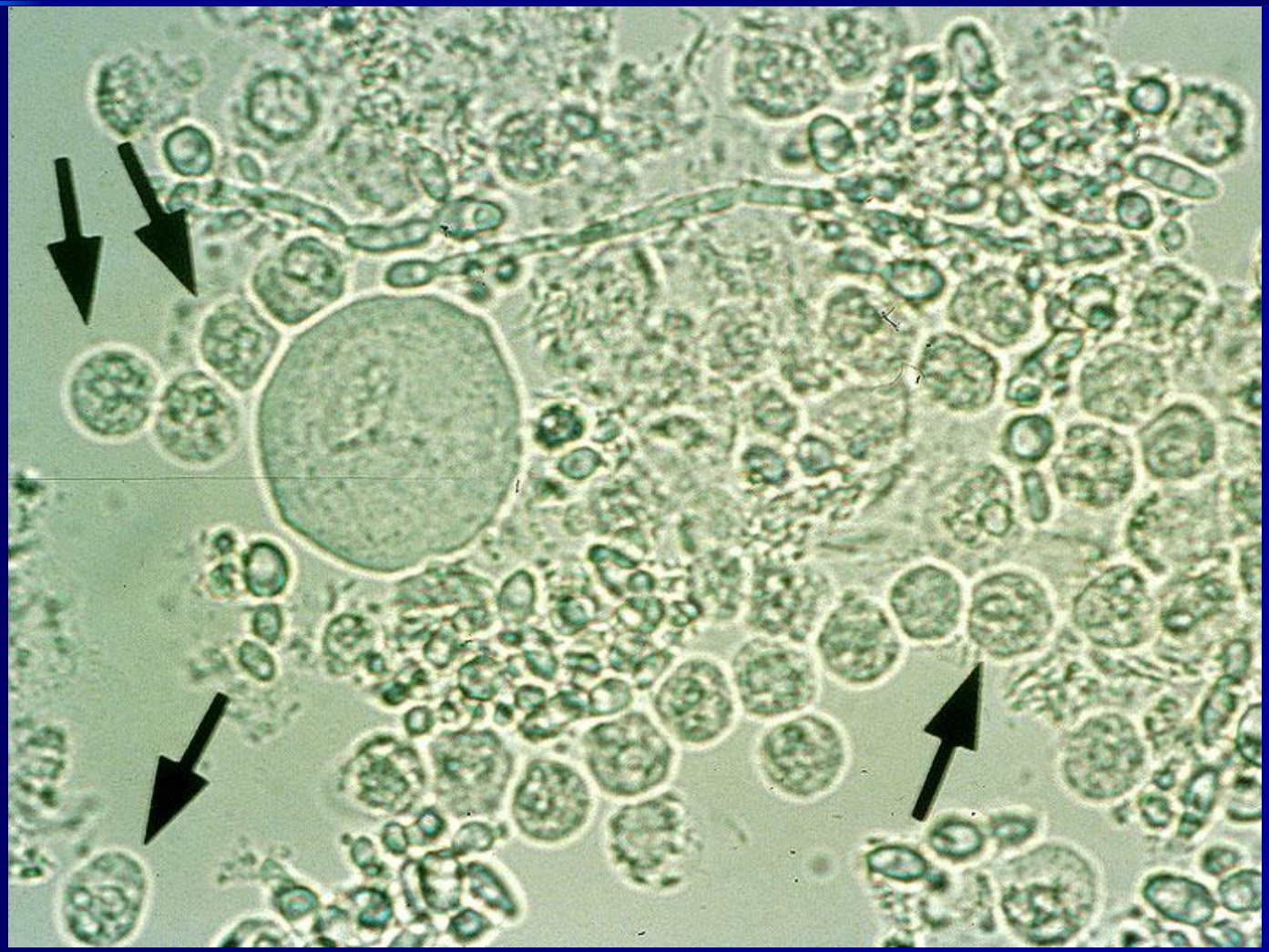
Microscopic Examination

RBCs



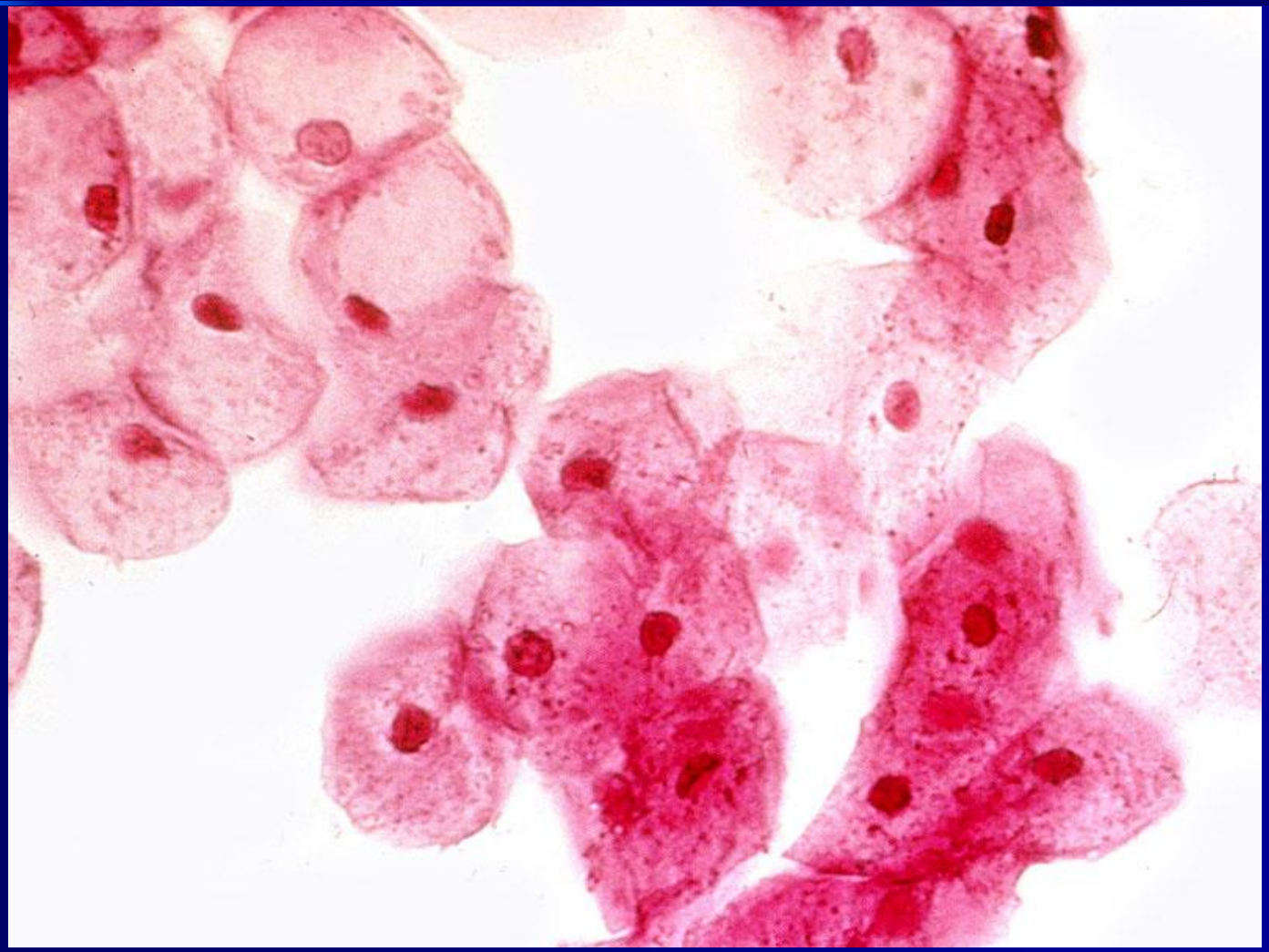
Microscopic Examination

WBCs

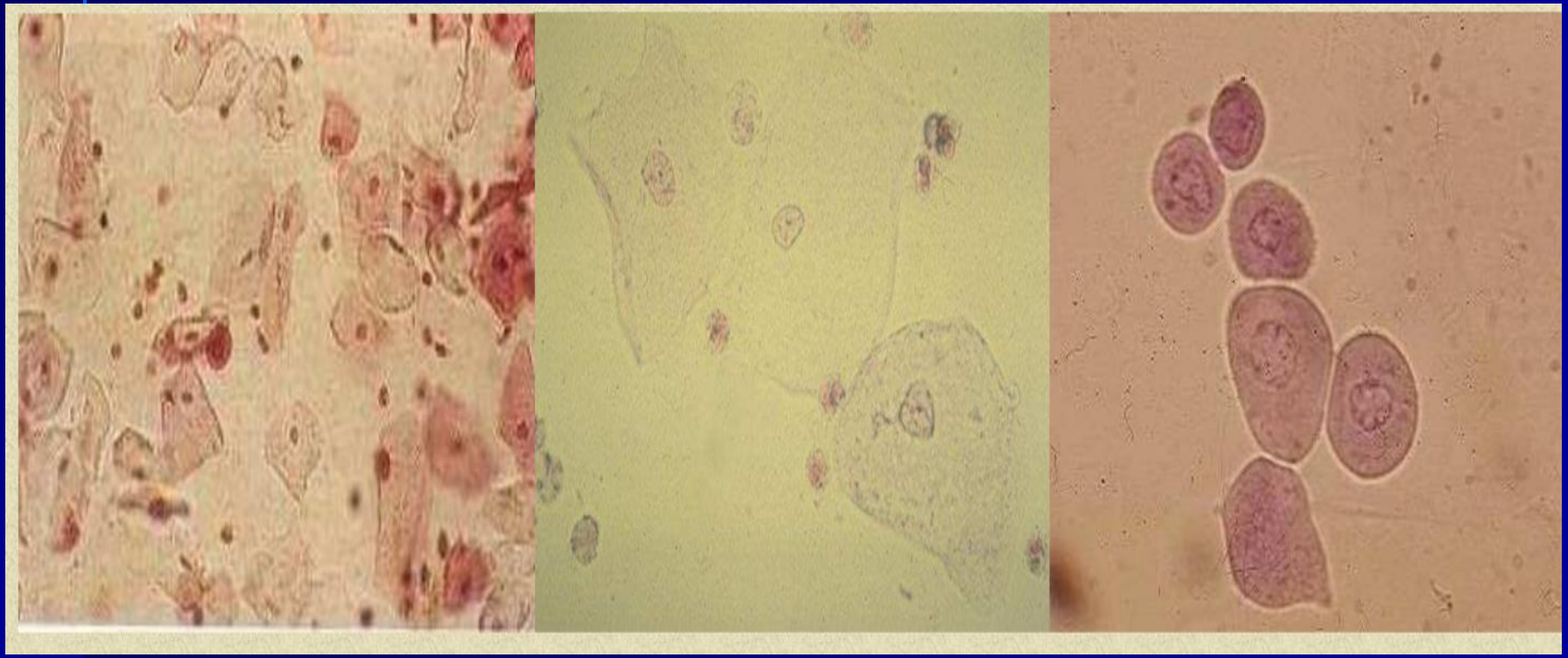


Microscopic Examination

Squamous Cells

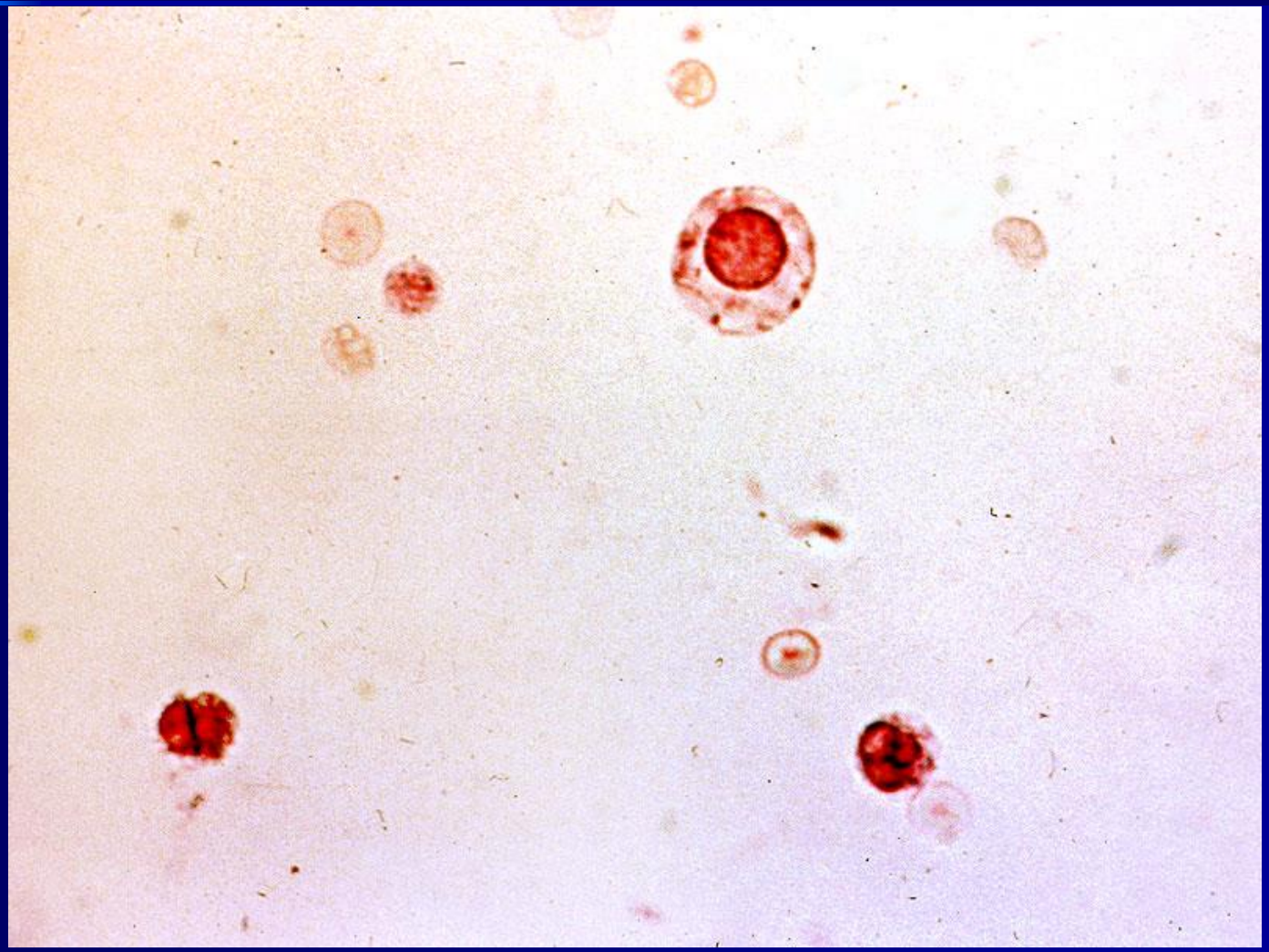


Squamous Cells



Microscopic Examination

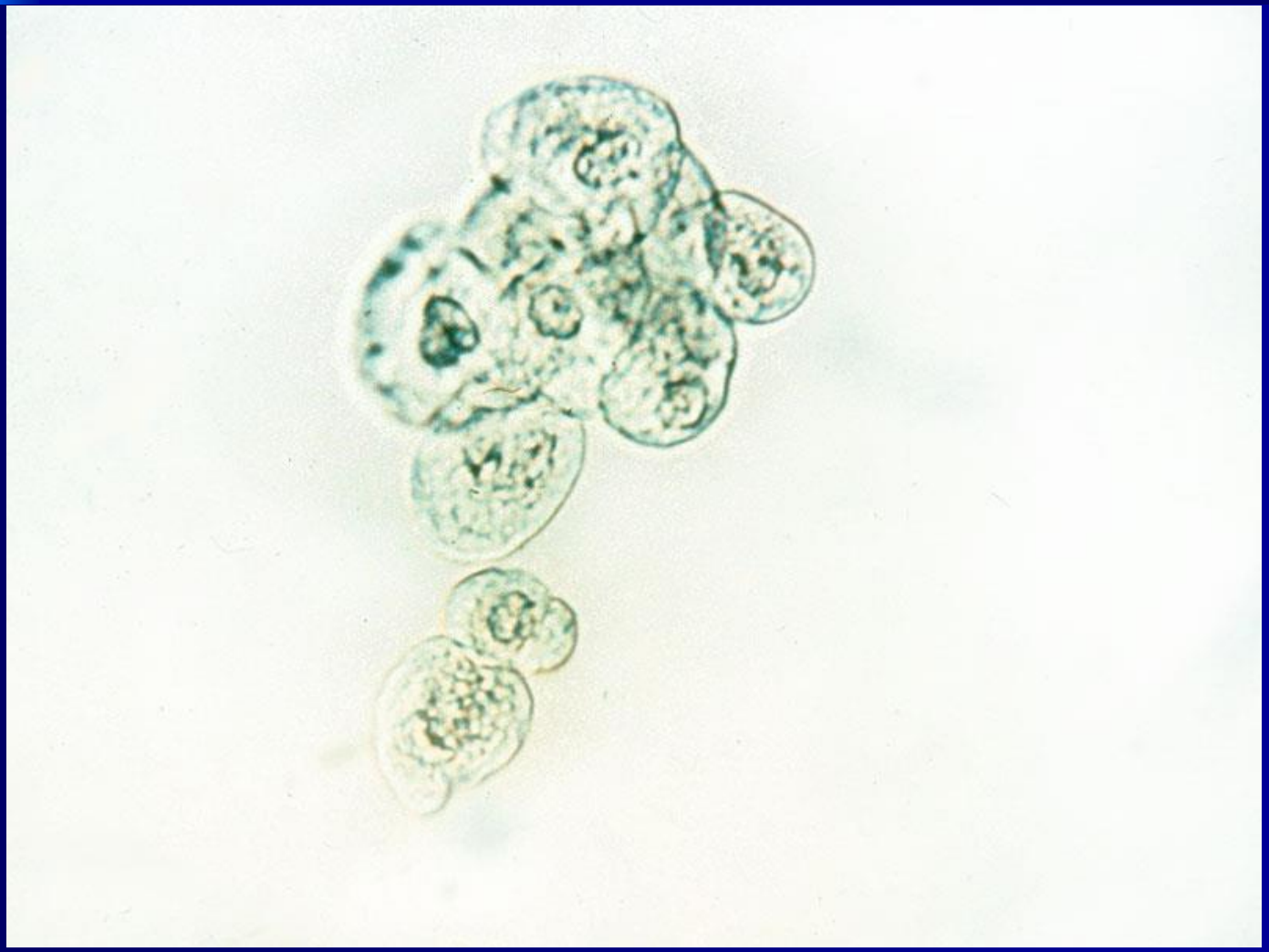
Tubular Epithelial Cells



Tubular Epithelial Cells

Microscopic Examination

Transitional Cells



Microscopic Examination

Transitional Cells

Microscopic Examination

Oval Fat Body

Microscopic Examination

LE Cell

Microscopic Examination

Bacteria & Yeasts

Bacteria

- Bacteriuria — More than 10 per HPF

Yeasts

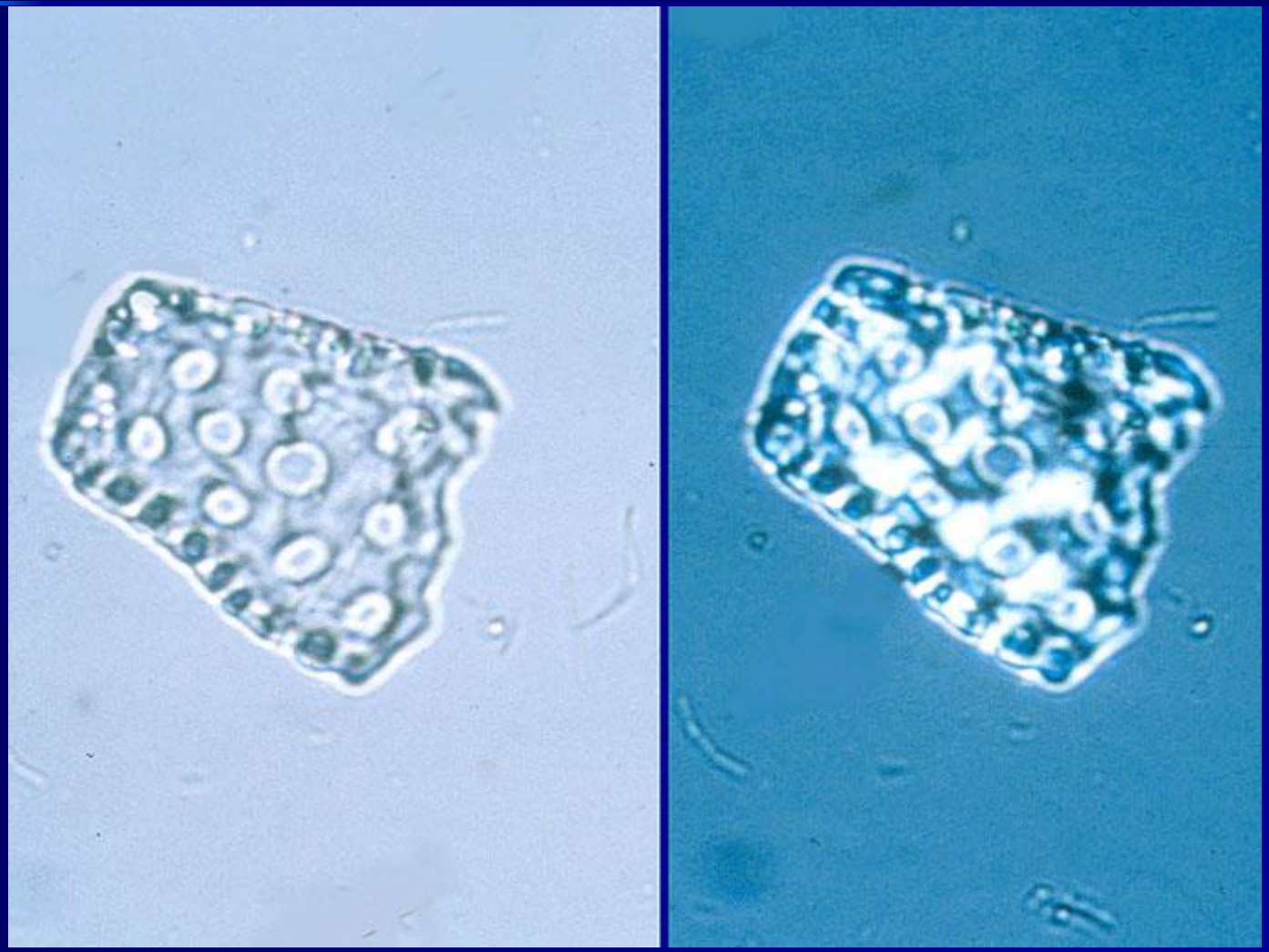
- Candidiasis — Most likely a contaminant but should correlate with clinical picture.

Viruses

- CMV inclusions — Probable viral cystitis.

Microscopic Examination

Bacteria



Microscopic Examination

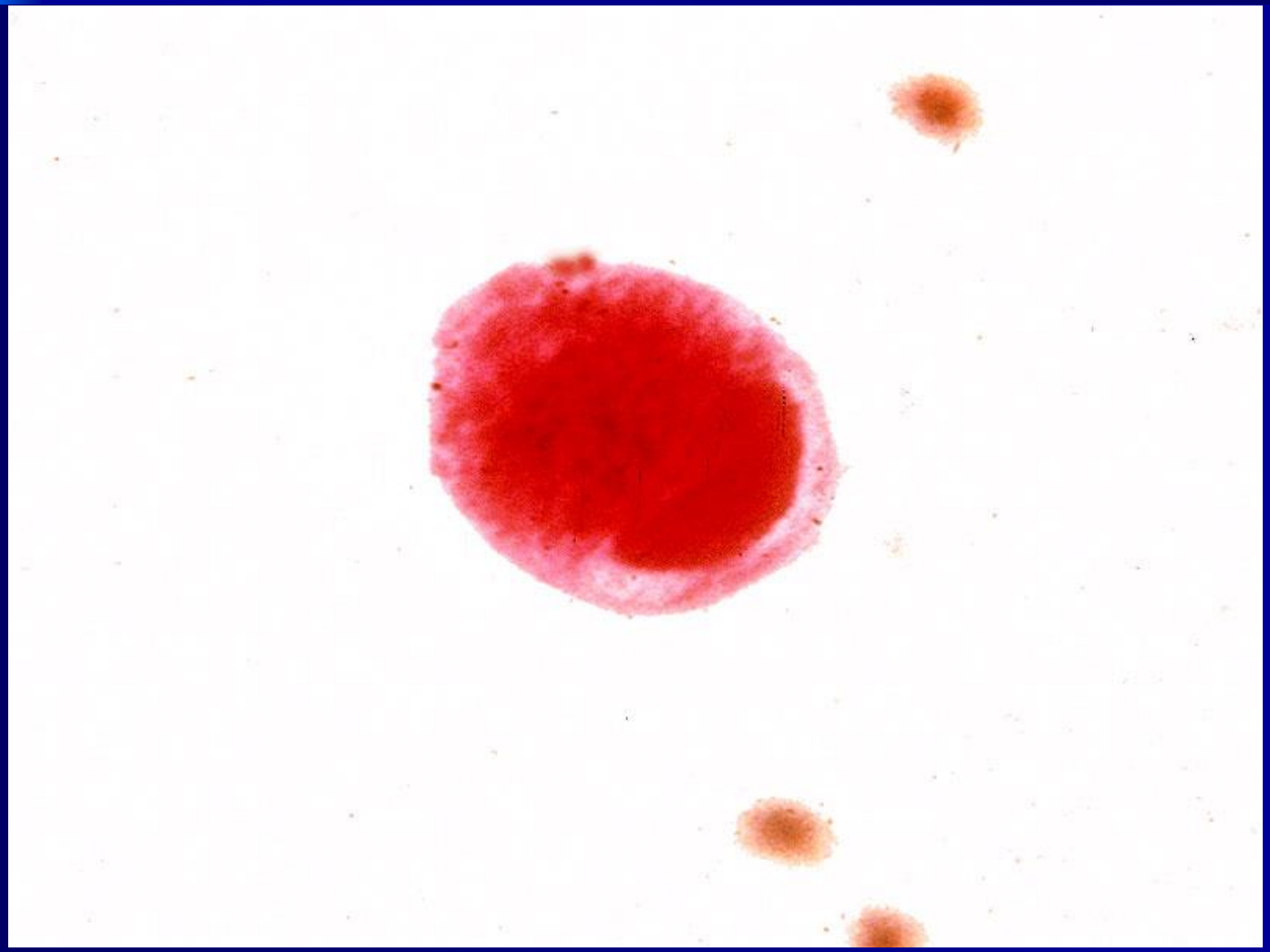
Yeasts

Microscopic Examination

Yeasts

Microscopic Examination

Cytomegalovirus



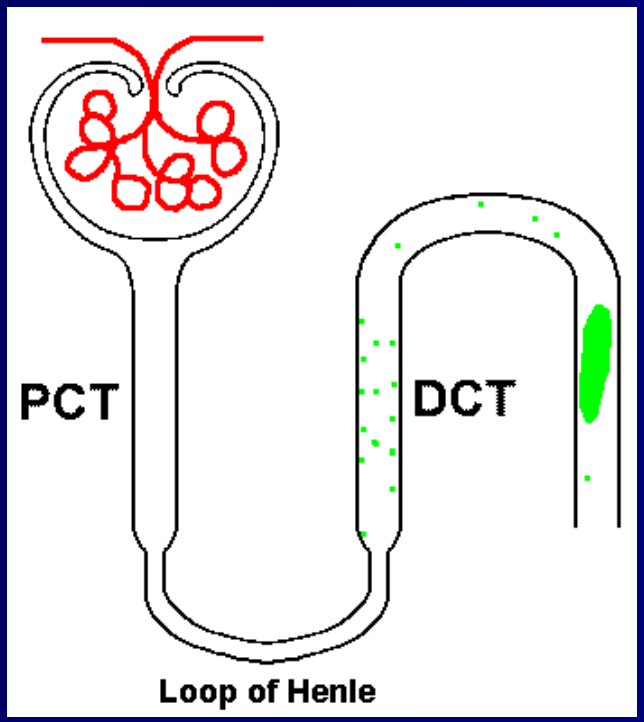
Microscopic Examination

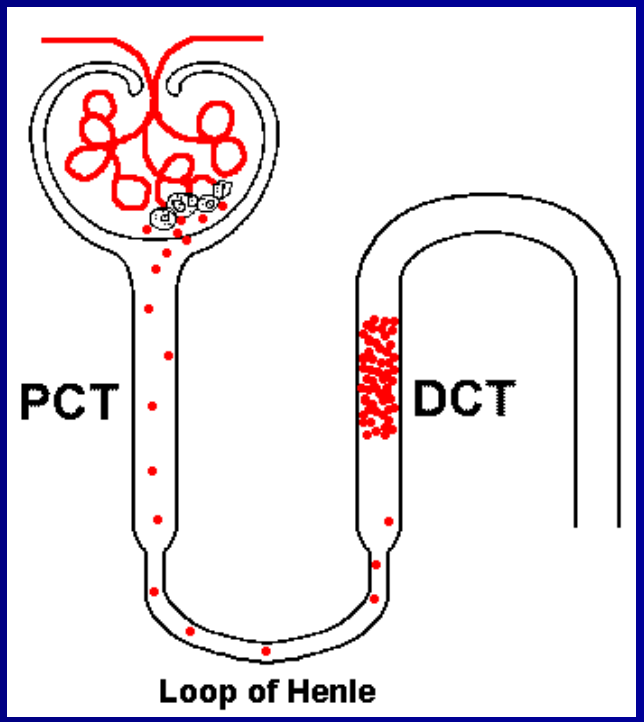
Casts

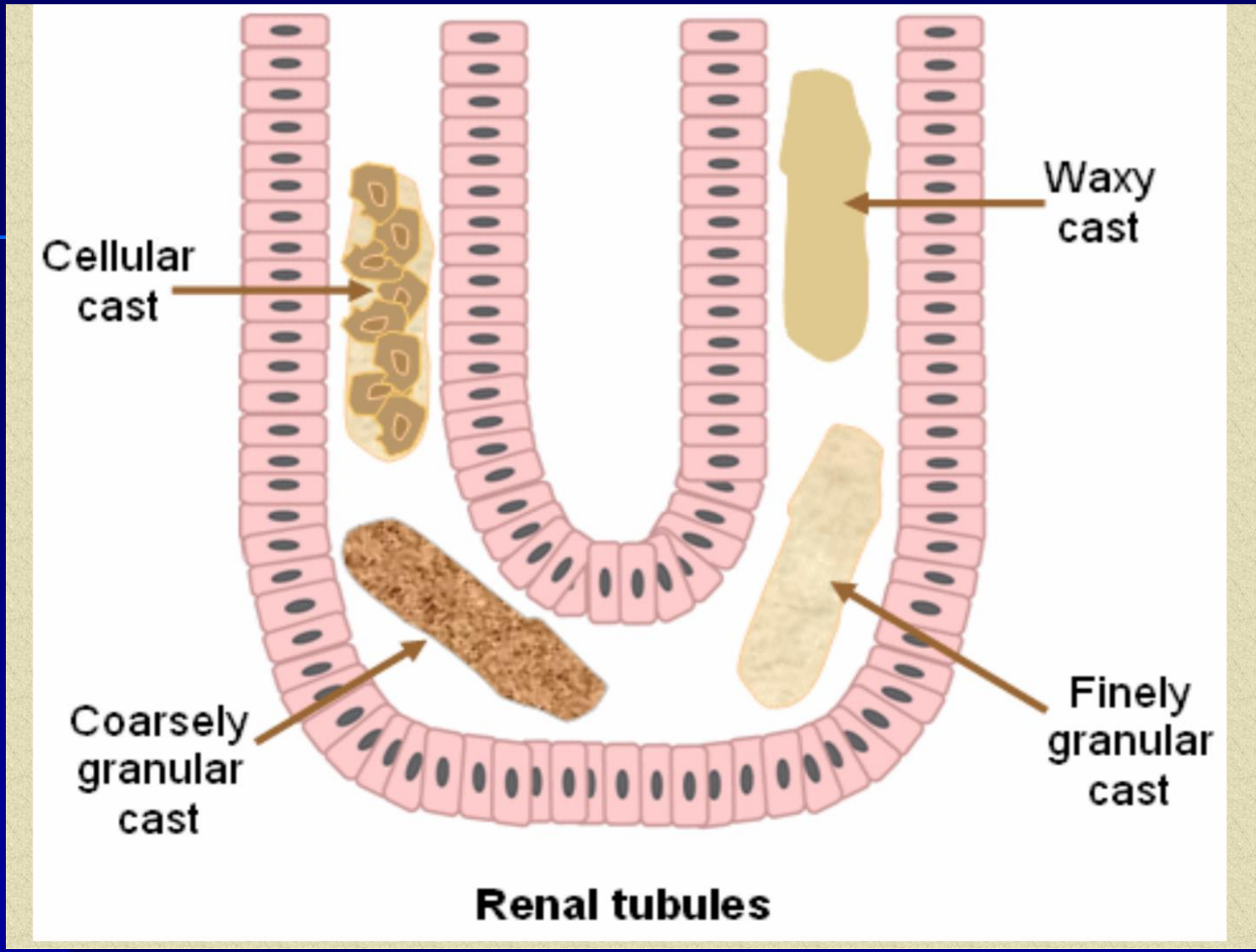
Erythrocyte Casts:	Glomerular diseases
Leukocyte Casts:	Pyuria, glomerular disease
Degenerating Casts:	
- Granular casts	Nonspecific (Tamm-Horsfall protein)
- Hyaline casts	Nonspecific (Tamm-Horsfall protein)
- Waxy casts	Nonspecific
- Fatty casts (oval fat body casts)	Nephrotic syndrome

Microscopic Examination

Casts





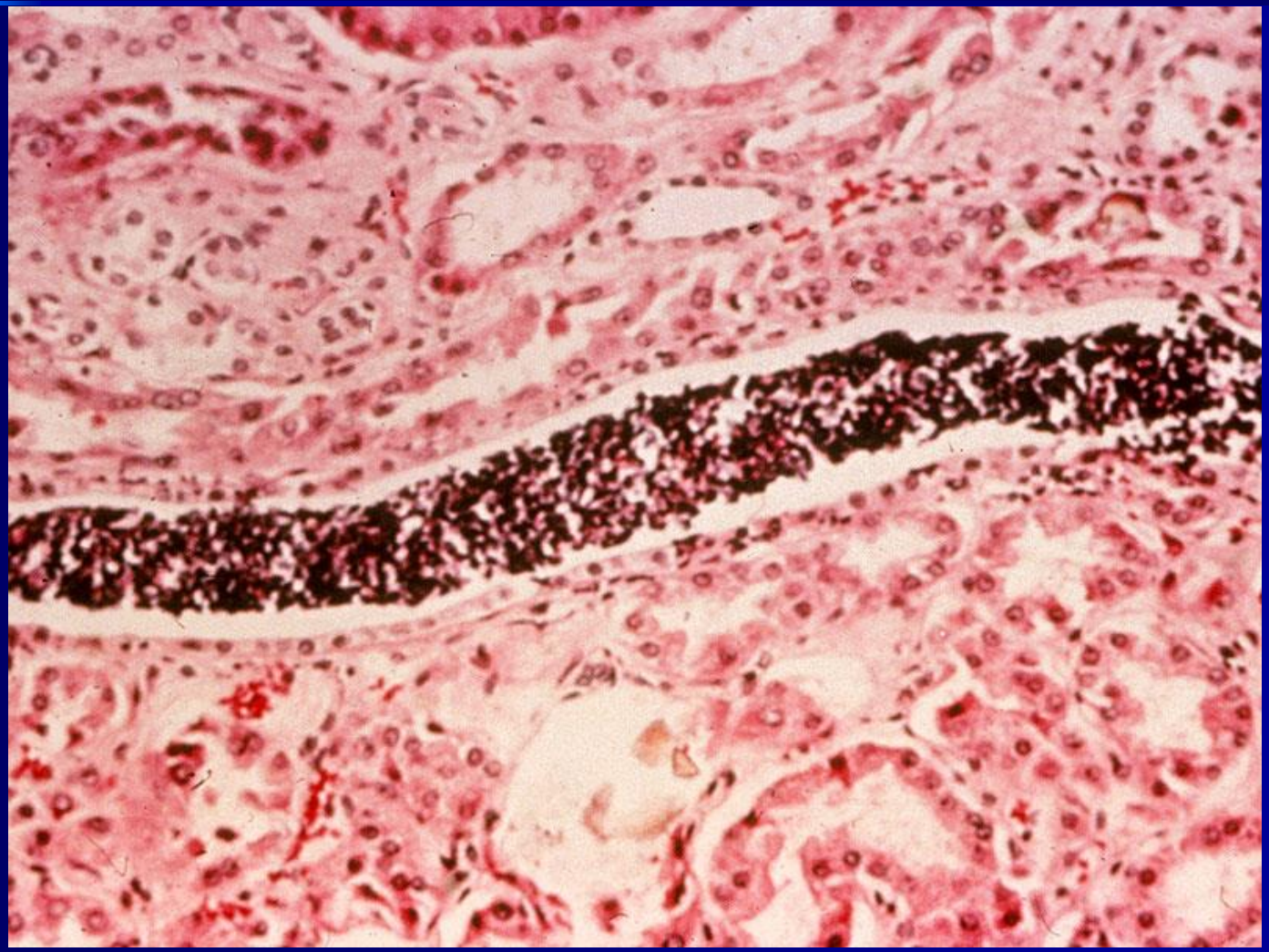

Cellular cast
Waxy cast
Coarsely granular cast
Finely granular cast
Renal tubules

Microscopic Examination

RBCs Cast

Microscopic Examination

RBCs Cast - Histology

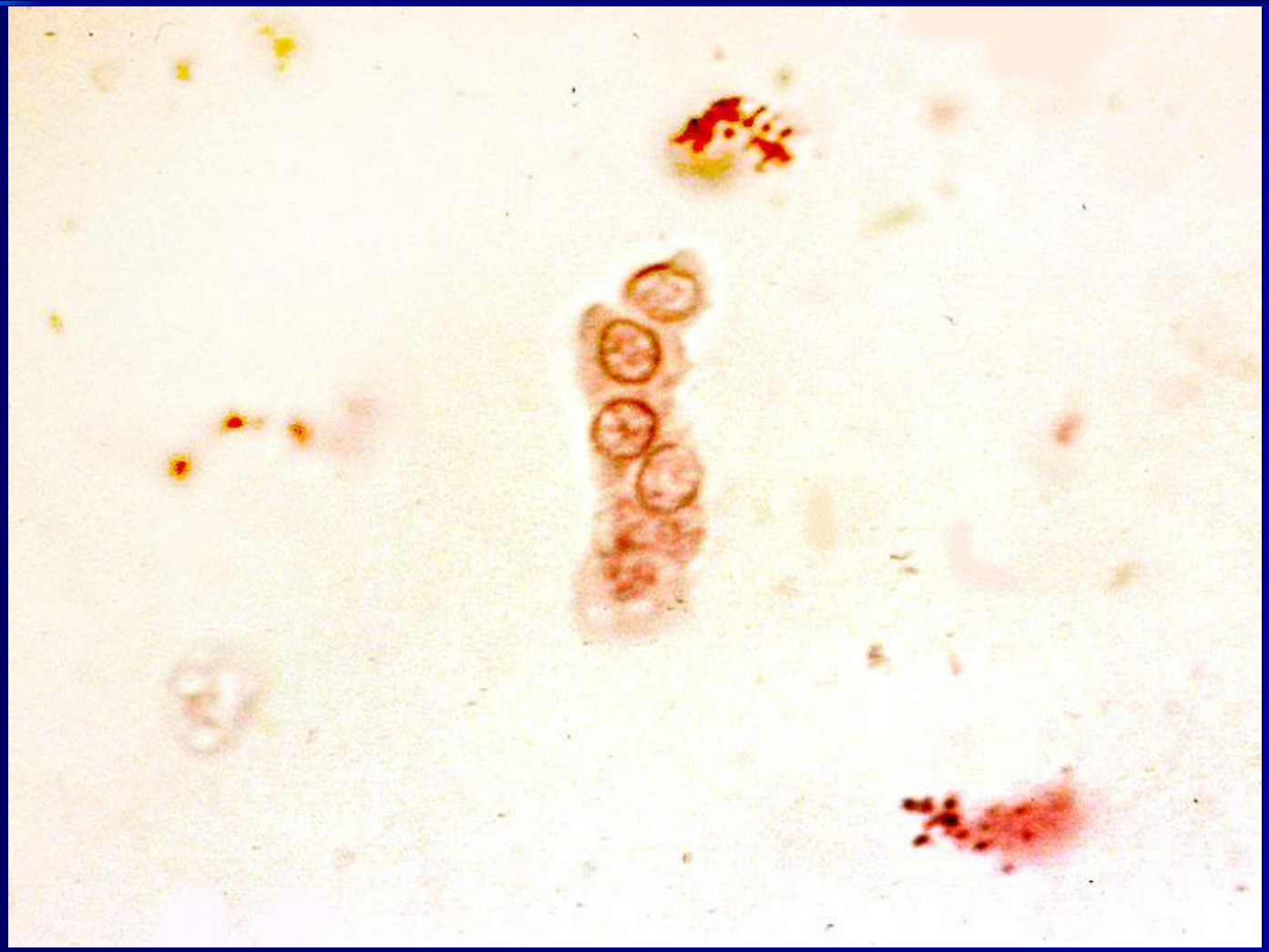


Microscopic Examination

WBCs Cast

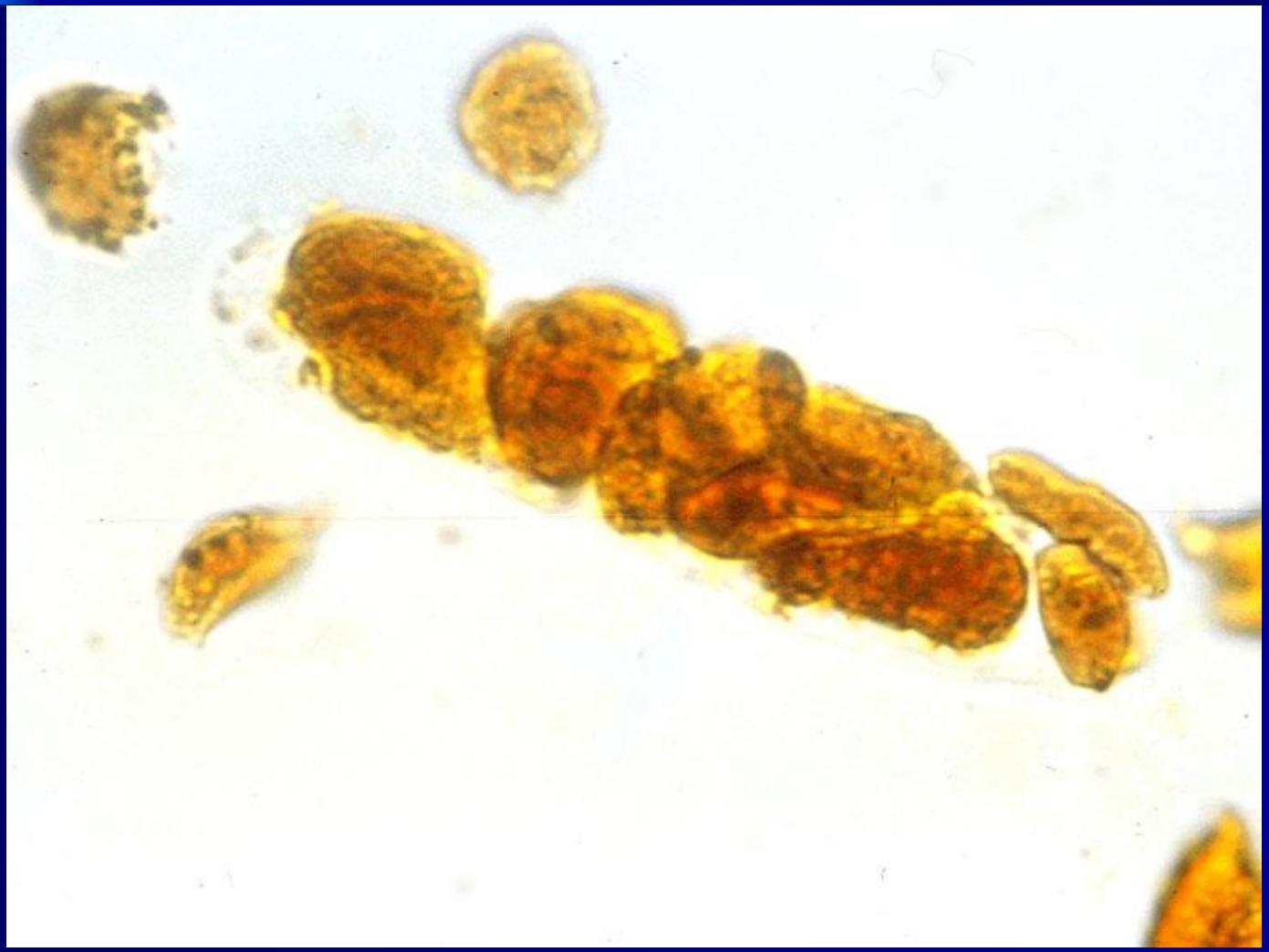
Microscopic Examination

Tubular Epith. Cast



Microscopic Examination

Tubular Epith. Cast

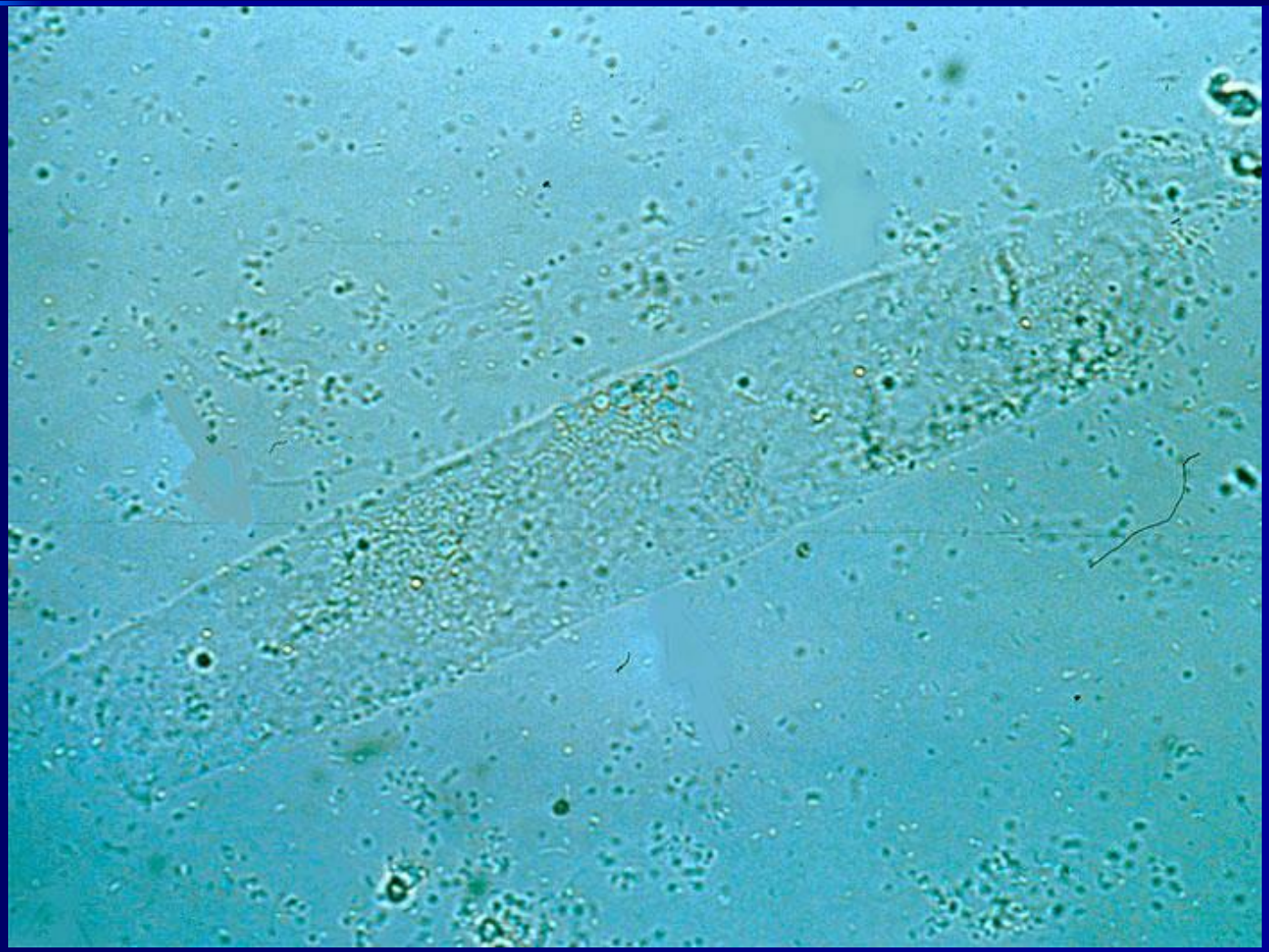


Microscopic Examination

Granular Cast

Microscopic Examination

Hyaline Cast

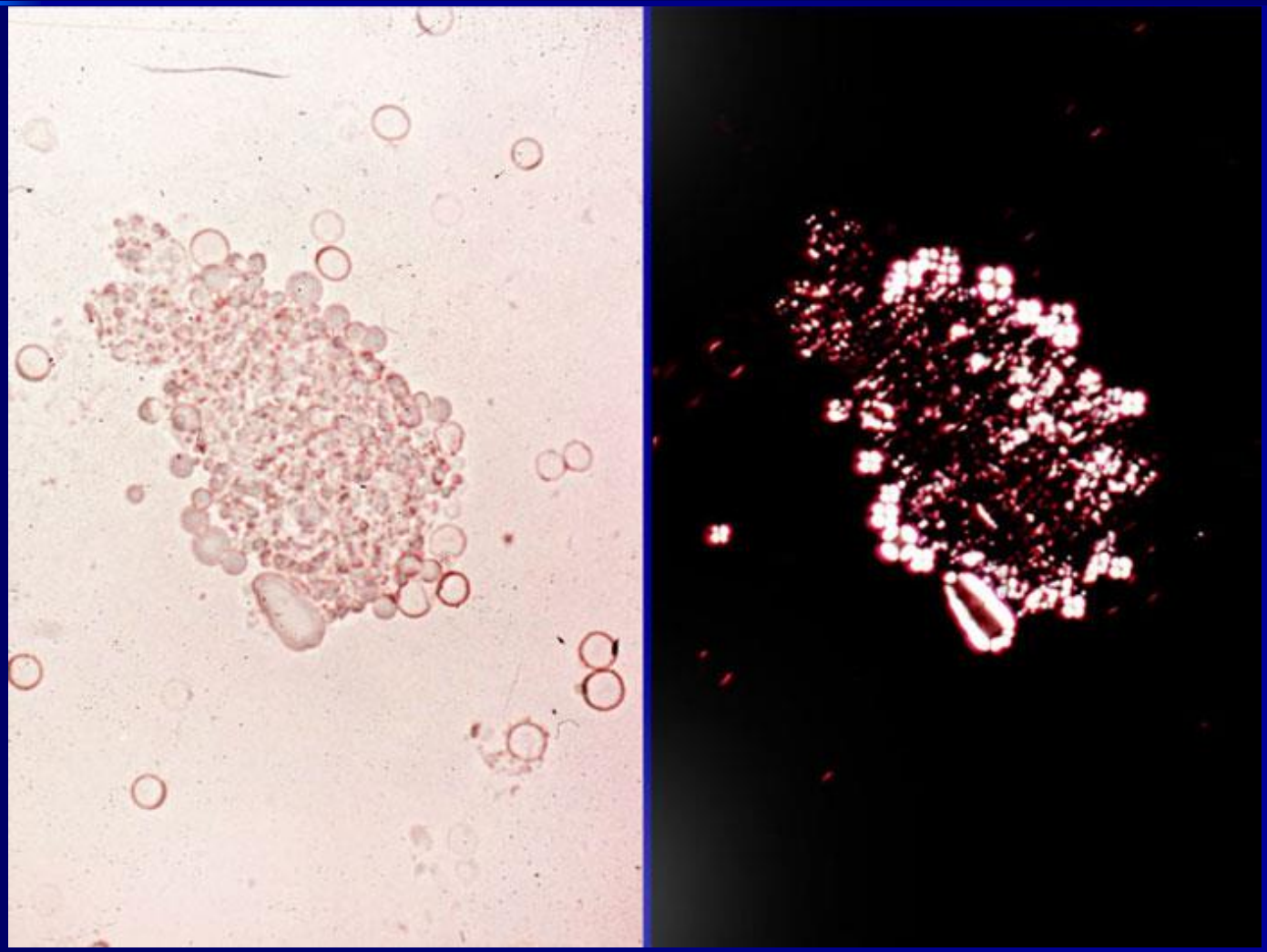


Microscopic Examination

Waxy Cast

Microscopic Examination

Fatty Cast



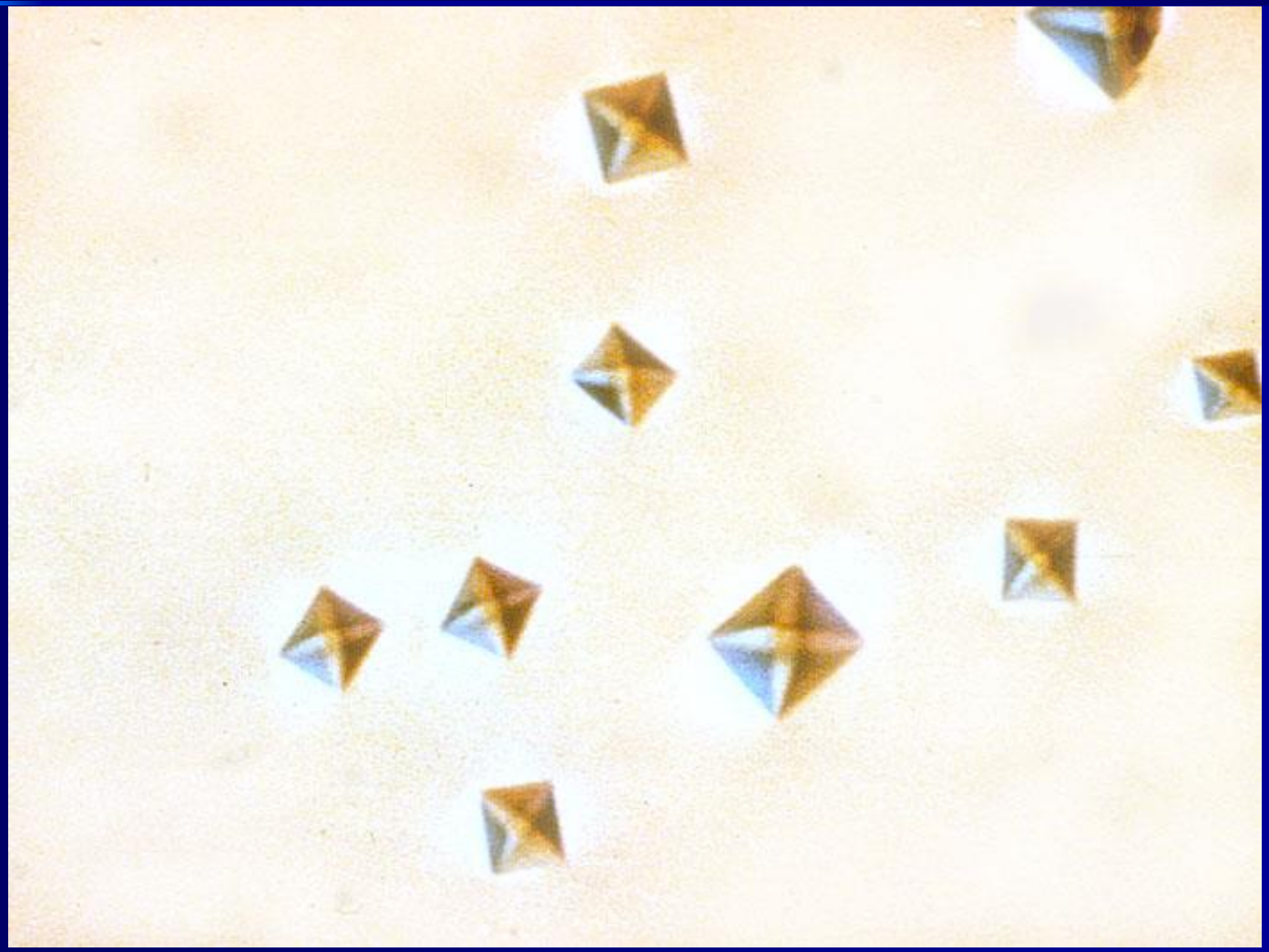
Microscopic Examination

Crystals

- **Urate**
  - Ammonium biurate
  - Uric acid
- **Triple Phosphate**
- **Calcium Oxalate**
- **Amino Acids**
  - Cystine
  - Leucine
  - Tyrosine
- **Sulfonamide**
- **Amorphous .**

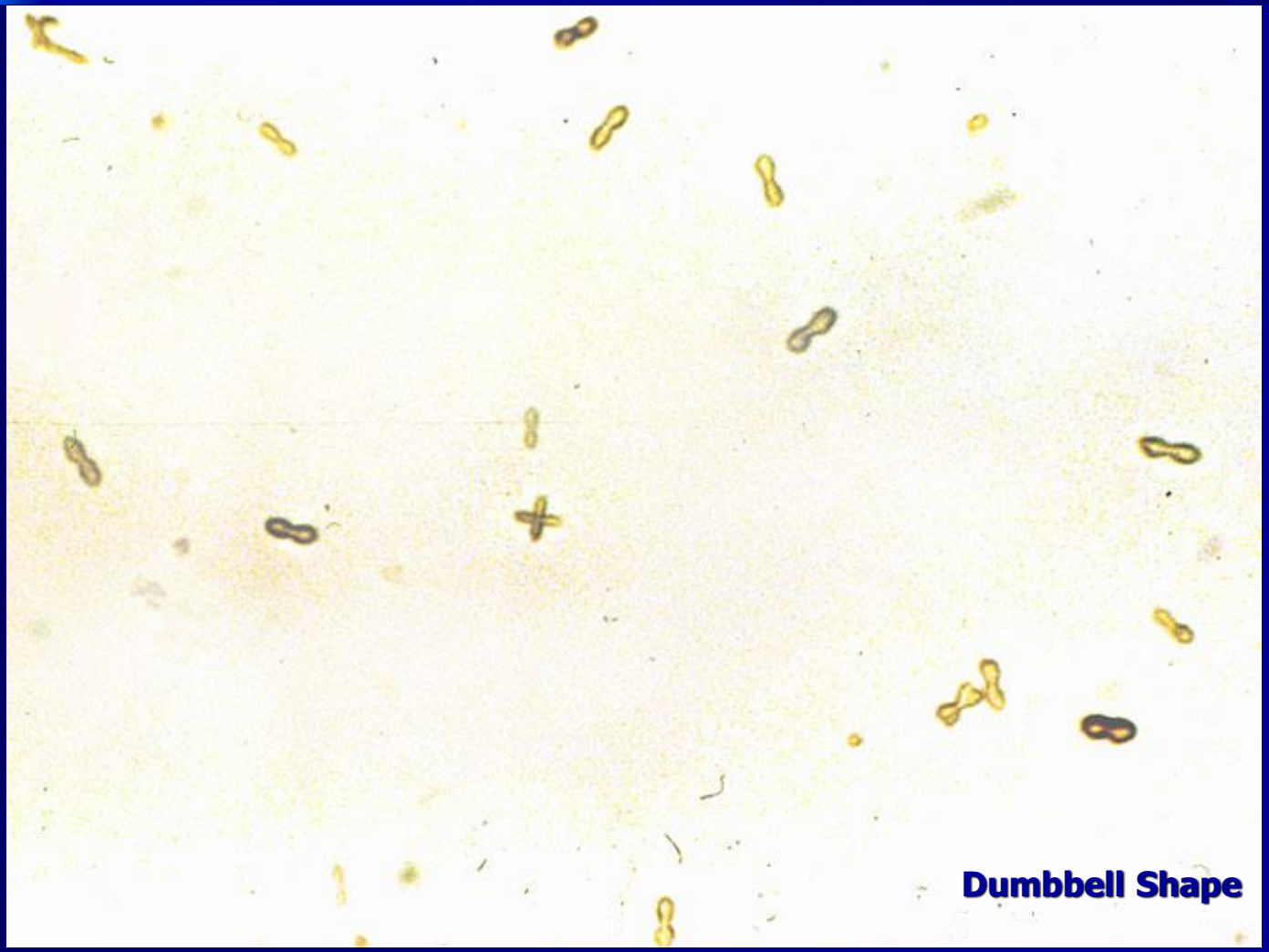
Microscopic Examination

Calcium Oxalate Crystals

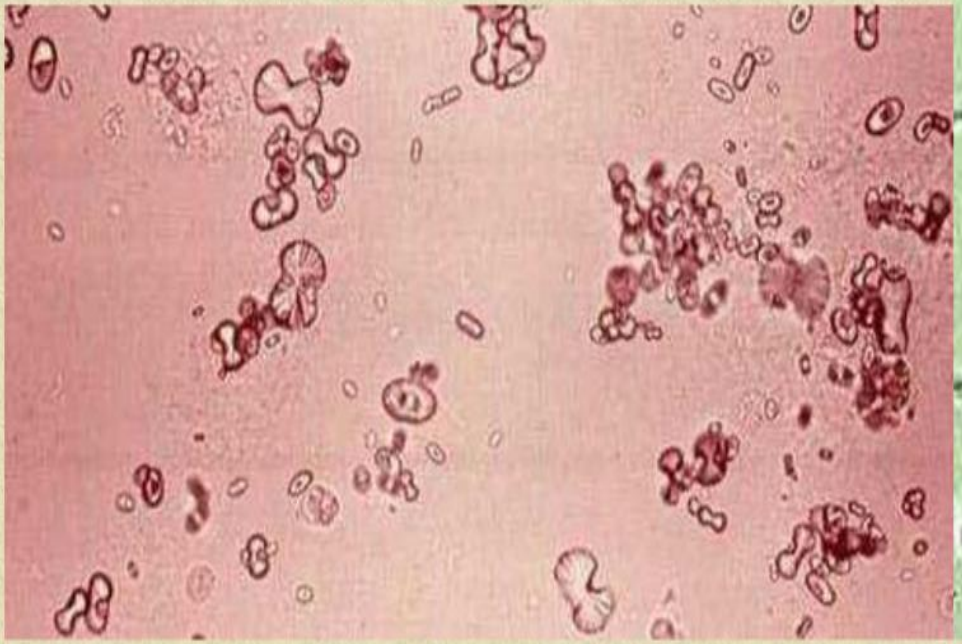


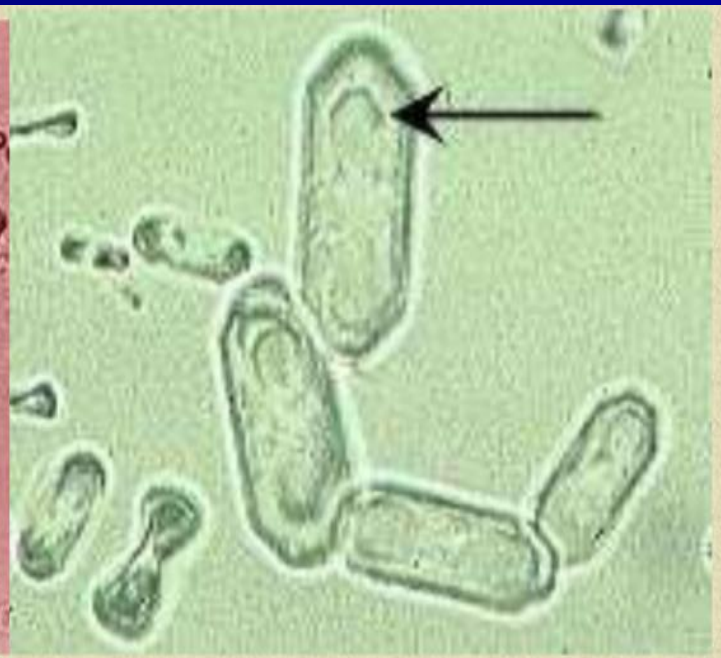
Microscopic Examination

Calcium Oxalate Crystals



Calcium Oxalate Crystals

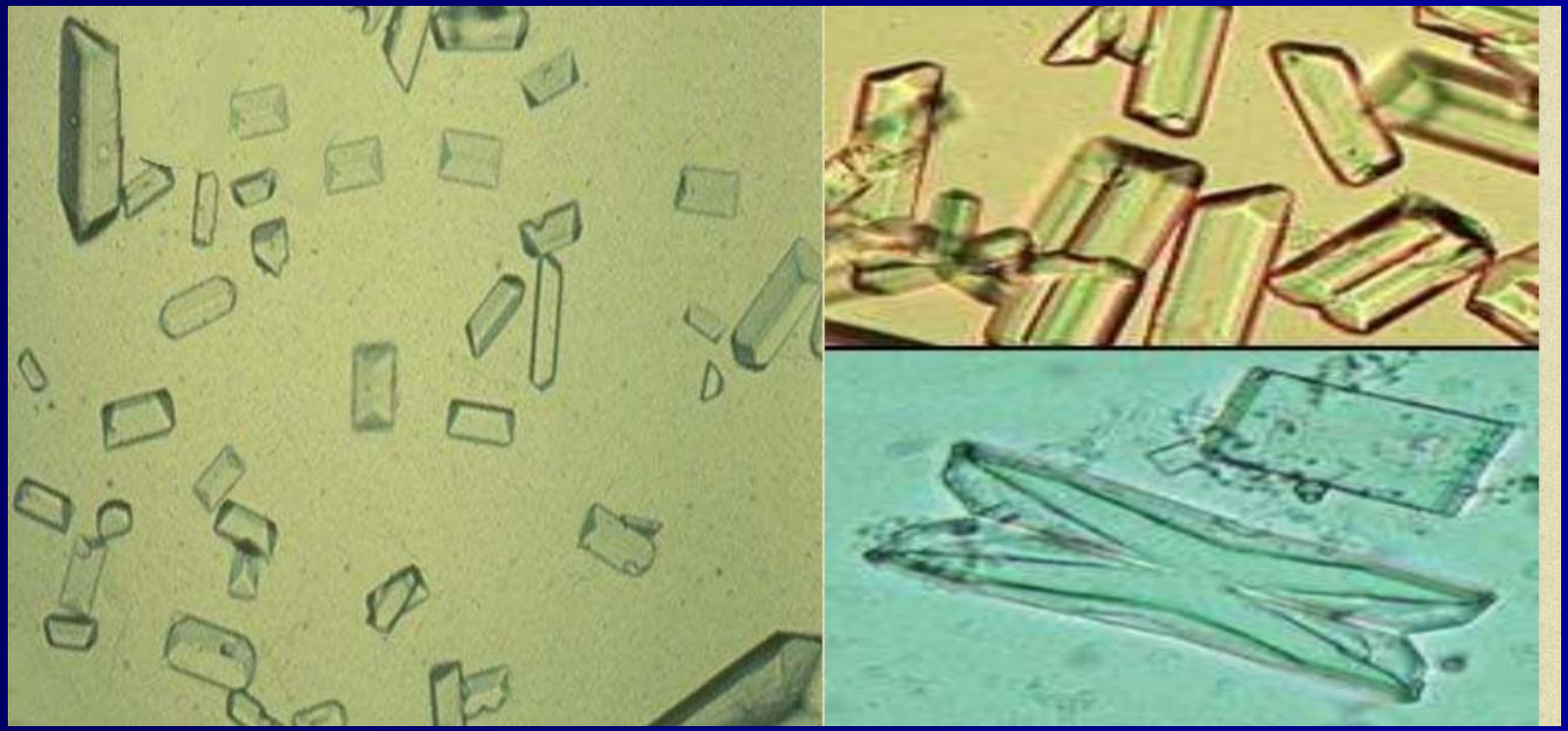




Microscopic Examination

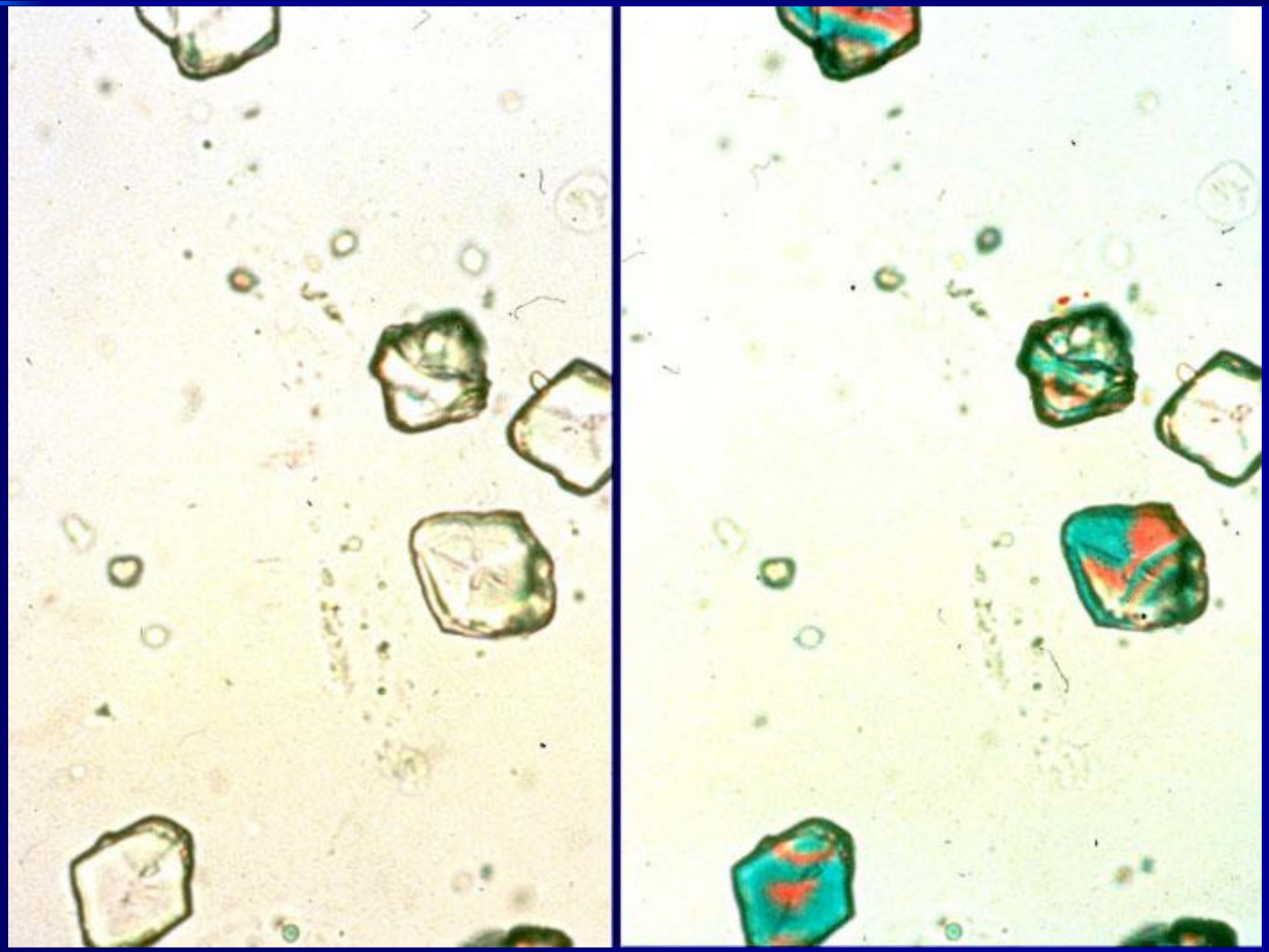
Triple Phosphate Crystals

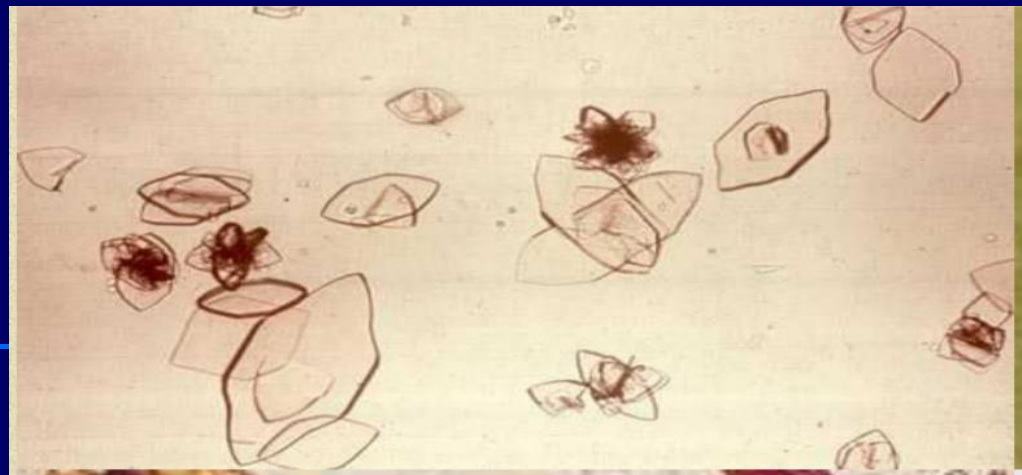
Triple Phosphate Crystals

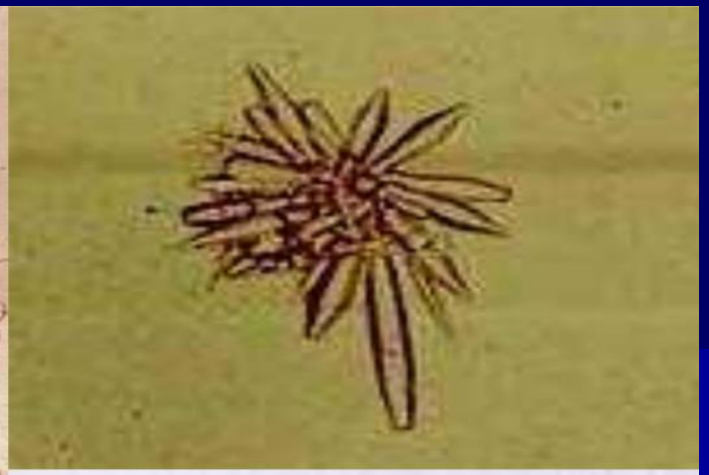


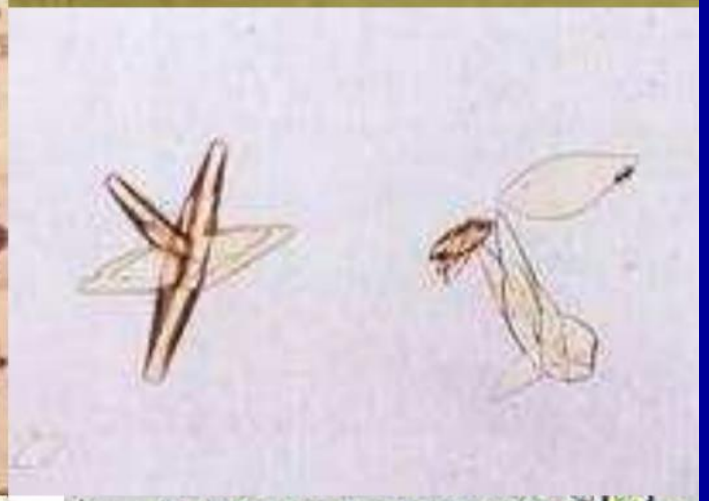
Microscopic Examination

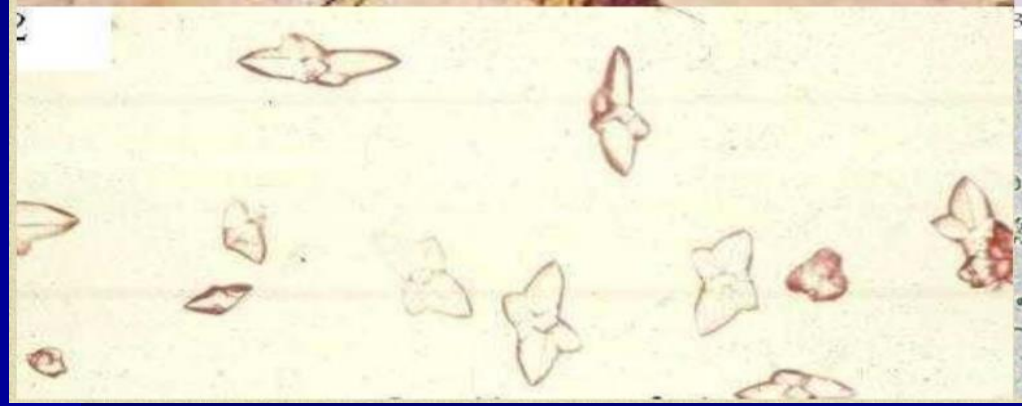
Urate Crystals

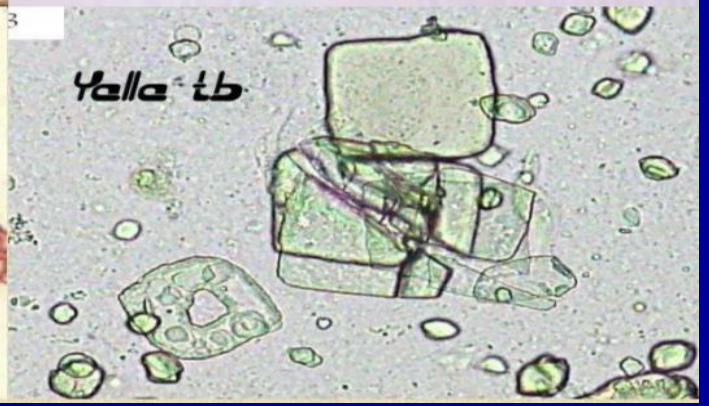








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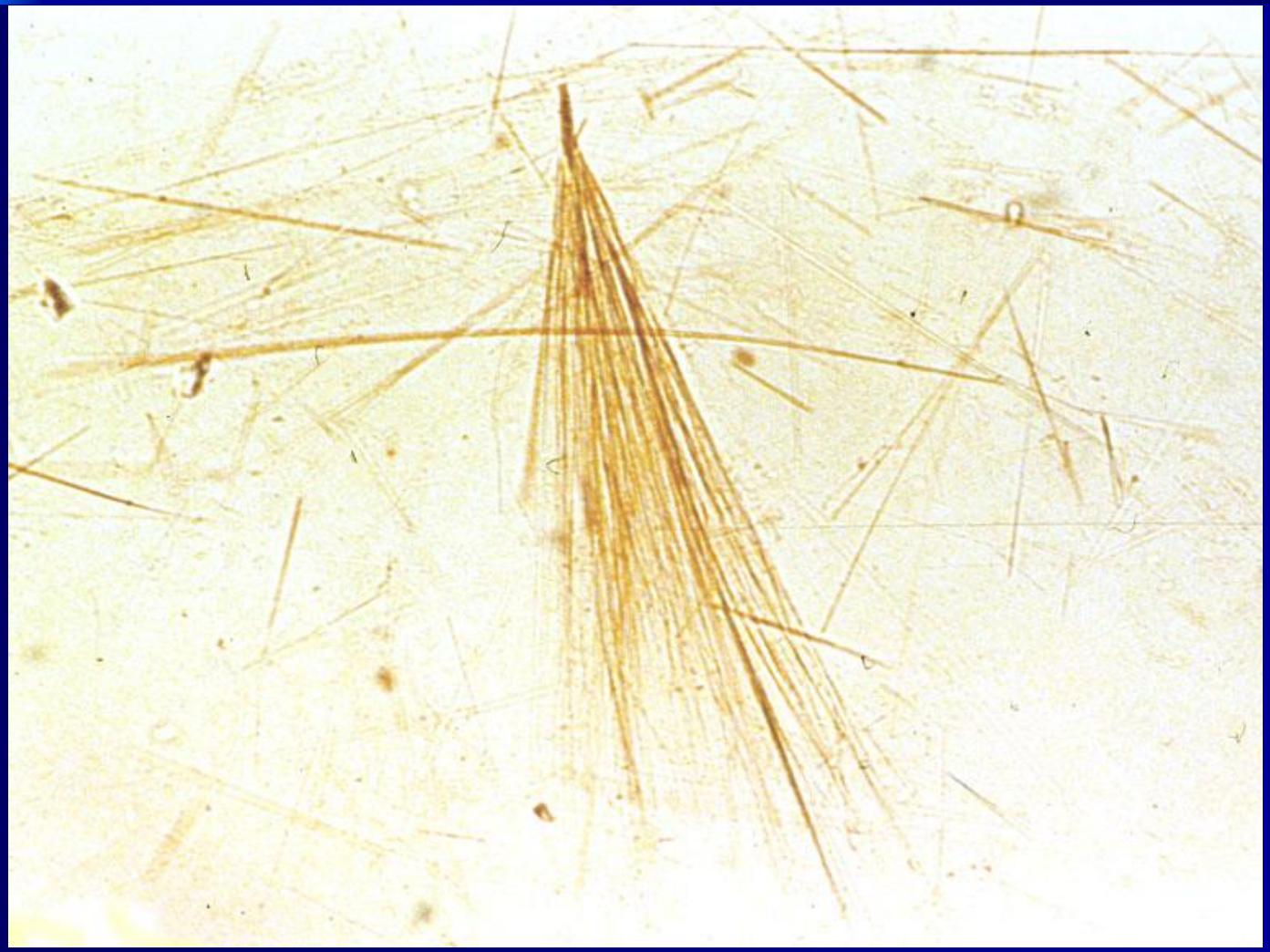
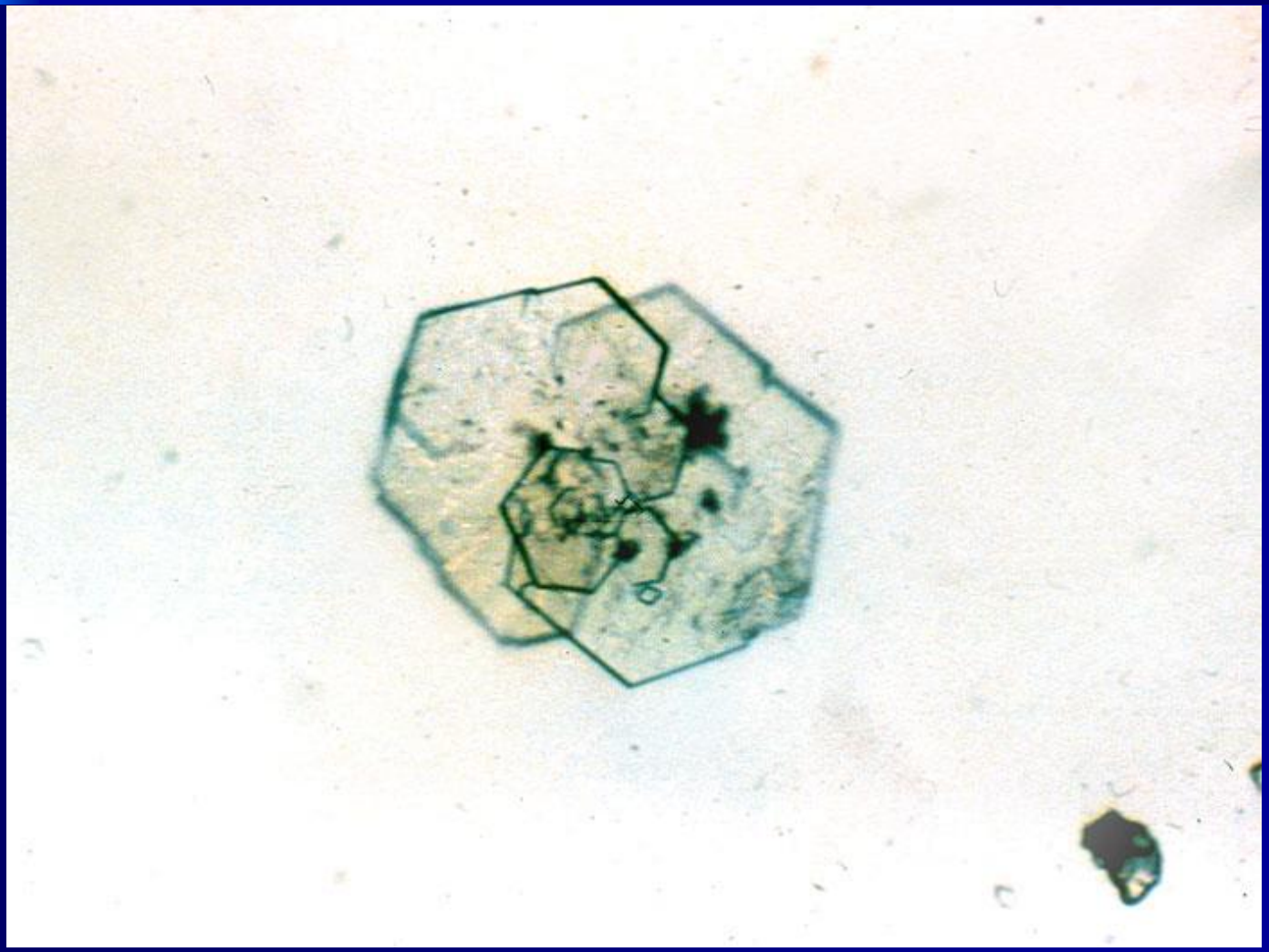
Microscopic Examination

Leucine Crystals



Microscopic Examination

Cystine Crystals



Microscopic Examination

Ammonium Biurate Crystals

Microscopic Examination

Cholesterol Crystals

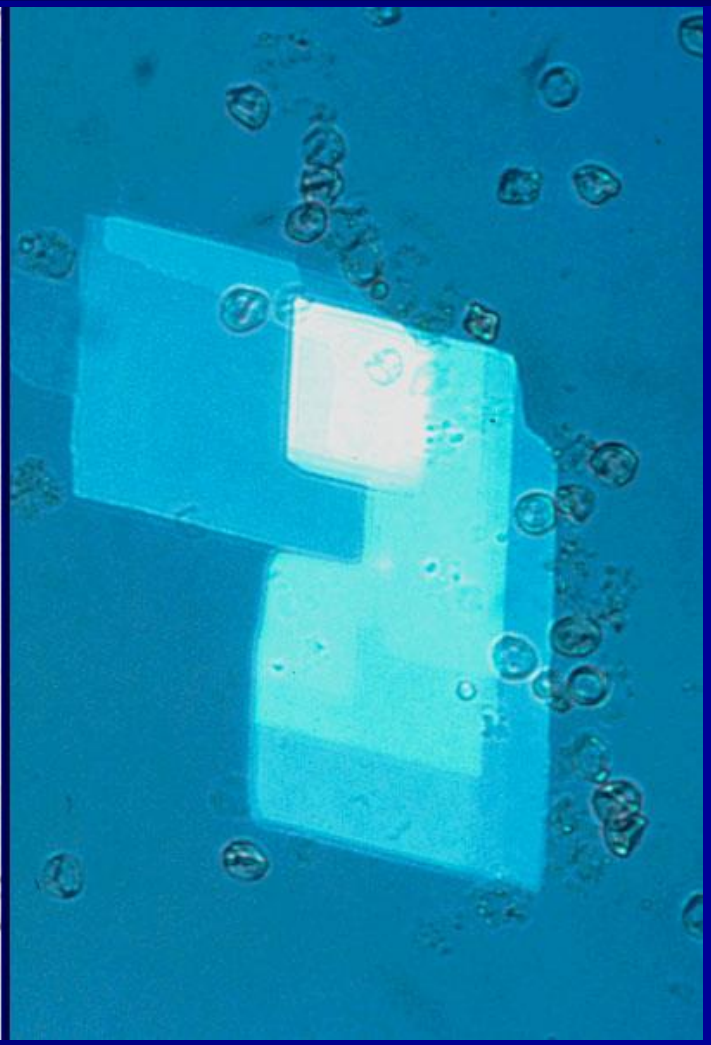


Table 6–2 Routine Urinalysis Correlations

Microscopic Elements	Physical	Chemical	Exceptions
RBCs	Turbidity Red color	+ Blood	Number Hemolysis
WBCs	Turbidity	+ Protein + Nitrite + Leukocytes	Number Lysis
Epithelial cells	Turbidity		Number
Casts		+ Protein	Number
Bacteria	Turbidity	pH + Nitrite + Leukocytes	Number and type
Crystals	Turbidity Color	pH	Number and type

`1

sperm

Mucus